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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Klaus Hahn

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EXAMINER

NEGRELLI, KARA B

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/581,948	Applicant(s) HAHN ET AL.	
	Examiner KARA NEGRELLI	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09/02/2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 1-4 and 6-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 5 and 13-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

**MOLDABLE FOAM MOLDINGS OF EXPANDABLE STYRENE POLYMERS AND
MIXTURES WITH THERMOPLASTIC POLYMERS**

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 9, 2010 has been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. Claims 1-3, 6, 9, and 12 were previously withdrawn. Claims 4, 7-8, and 10-11 have been cancelled. New claims 17-25 have been added.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5, 13, 15, 17-20, and 23-25 rejected under 35 U.S.C. 103(a) as being unpatentable over Henn et al. (US 5,525,637).

5. It is noted that while claim 5 claims a polystyrene, the claims are recited in the product-by-process format by use of the language, "A process...comprising...a polymer mixture comprising 50 to 90% by weight of polystyrene B selected from **free-radical polymerized** glass-clear polystyrene (GPPS) or **anionically polymerized** polystyrene..." Case law holds that:

Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. See *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

6. To the extent that the process limitations in a product-by-process claim do not carry weight absent a showing of criticality, the reference discloses the claimed product in the sense that the prior art product structure is seen to be no different from that indicated by the claims. It is noted that while the claim is drawn to a process, the claim contains a product-by-process within it. **"Free-radical polymerized" is a process by which the styrene of the invention may be produced.**

7. Henn et al. teach expandable styrene polymers comprising a mixture of (a) from 50 to 90% by weight of polystyrene and/or a styrene copolymer containing at least 50% by weight of copolymerized styrene, (b) from 5 to 30% by weight of at least one styrene-soluble elastomer, (c) from 5 to 20% by weight of a styrene block copolymer, and (d) from 1 to 15% by weight of a low-boiling point blowing agent, as well as optional additives. In the styrene polymer mixture of Henn, (a), which makes up 50 to 90% of the mixture, may be polystyrene (corresponding to polystyrene B of instant claim 1) (column 2, lines 24-26). Component (b), which makes up 5 to 30% by weight of the mixture, is at

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least one styrene-soluble elastomer. According to Henn, styrene soluble elastomers include styrene-acrylonitrile copolymers (column 3, lines 48-51). Component (c) is a conventional block copolymer comprising at least 20% by weight styrene and a comonomer such as butadiene (thus, component (c) may be styrene-butadiene block copolymer and this corresponds to polystyrene A of instant claim 5 (column 4, lines 8-15). Therefore, the addition of component (b), a styrene soluble elastomer, which may be styrene-acrylonitrile, which may be included in the polymer mixture of instant claim 5, does not materially affect the basic and novel characteristics described by the instant application. The styrene polymers are prepared by mixing the components in a melt using an extruder, where during addition of from 1-15% by weight of a blowing agent (column 2, lines 31-32), the extrudate must be cooled so rapidly after extrusion so that foaming does not occur (column 5, lines 1-5). The resultant styrene polymer is subsequently comminuted, usually by granulation (column 5, lines 5-6).

8. Henn et al. teach that the mixing of components (a)-(c) is carried out by extrusion (column 5, lines 25-26). The styrene polymer must be subsequently impregnated with a blowing agent (column 5, lines 27-28). This may be "achieved by adding the blowing agent to the molten polymer, for example during extrusion" (column 5, lines 29-30). The resultant polymers are comminuted to sizes of from 0.1 to 6 mm (preferably 0.4 to 3 mm) (column 5, lines 34-36). This is carried out by granulation after extrusion (column 5, lines 36-37). The particles are usually in bead form or pellet form (column 5, lines 38-39). The granules then are suspended in a liquid, usually water (column 5, lines 40-41). Henn et al. do not specify at what pressure pelletizing is performed. One of ordinary

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skill in the art would recognize that because no pressure is specified, the process is expected to be performed at atmospheric pressure (1 bar).

9. Henn explicitly teaches that a polymer melt comprising components (a), (b), and (c) is mixed in extruder and the styrene polymer melt is subsequently "impregnated" with a blowing agent. "Impregnation," according to the invention of Henn, can be "achieved by adding the blowing agent to the molten polymer, for example during extrusion," (column 5, lines 24-31) at which point foaming is prevented. Henn also teaches at column 5, lines 1-5 that the polymers of the invention are prepared by mixing components (a), (b), (c) and (d) in a melt in an extruder and subsequent granulation of the polymer (which contains blowing agent).

10. As the melt is forced through the die, or slightly prior to extrusion through the die plate, the melt will cool to a temperature which falls within the instantly claimed range of instant claims 5 and 13. After passing through the die plate, or immediately prior to being forced through the die plate, the melt cools, eventually to a temperature which would be below 180°C (the temperature to which the melt was originally heated). In the process of cooling from 180°C to room temperature (which happens as the melt is forced through the die), the melt is cooled to a temperature range which falls within the instantly claimed range of claims 5 (at least 120°C) and 13 (150-200°C), because when cooling, the melt of Henn reaches a temperature which is lower than that to which it was originally heated (lower than 120-180°C).

11. Henn et al. further teach an embodiment in which components (a), (b), and (c) are melt mixed at a temperature of 180 °C in an extruder to form a polymer melt

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(column 6, lines 36-41). Thus, Henn teaches melt mixing all of the components (a), (b), and (c) of Henn to temperature of 180°C, said mixture of which may contain blowing agent therein (given the “impregnation” described above). This mixture, which may comprise blowing agent as per the aforementioned reasons, is forced through a die plate having 1 mm bores (column 6, lines 42-43). The extrudates are solidified in water and granulated into particles (beads or pellets) (column 6, lines 43-45), and thus are pelletized “directly downstream” of the die plate as indicated in instant claim 5. The beads had a density of 23.8 g/L (column 7, line 4).

12. Henn et al. further teach that the formed expandable styrene particles can be welded to form moldings (column 5, lines 60-61, relevant to instant claim 7), and the moldings have a density of from 5 to 70 g/L (column 5, line 63).

13. Henn teach the process described above, but do not expressly teach that the diameter of the holes in the die plate are from 0.3 to 0.8mm. However, the examiner takes official notice that it would have been obvious to use a die plate with holes with a diameter of 0.3 to 0.8 mm (rather than 1 mm as expressly disclosed in Henn) if smaller strands (and thus smaller polystyrene granules) are desired. Case law holds that changes in size or shape of a device are obvious. *In Re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955) which demonstrated that “limitations relating to the size...were not sufficient to patentably distinguish over the prior art,” from MPEP 2144.04, part IV. See also *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), where the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of

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relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. The prior art device in questions is a die plate with holes for extrusion, which would not perform differently than the instantly claimed die plate.

14. Claims 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Henn et al. (US 5,525,637) and further in view of Glück et al. (US 6,340,713).

15. Henn et al. teach the process as applied to claim 5 above but do not expressly teach that the polymer melt comprising the blowing agent downstream of the die plate under water is pelletized at a pressure of from 5 to 15 bar.

16. However, Glück et al. teach a mixture comprising molten polystyrene which is passed through a die plate at 180°C and the molten mixture of which, after coming out of the die, is granulated under a pressure of 5 bar (column 7, lines 18-23). The granulation can be carried out underwater (column 3, lines 20-21).

17. It would have been obvious for one of ordinary to granulate the polystyrene mixture of Henn et al. under a pressure of 5 bar as taught in Glück et al. in order to avoid premature foaming (column 3, lines 19-21).

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18. Claims 16 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Henn et al. (US 5,525,637) and further in view of Loo (US 4,284,553).

19. Henn et al. teach the process as applied to claim 5 above but do not expressly teach that the temperature of the die plate is from 20 to 100°C above the temperature of the polymer melt comprising blowing agent.

20. However, Loo teaches a process for extruding and granulating thermoplastic material through an extruder or melt pump having an extrusion die including a die face plate which forms or is provided with an insulation member, the die plate being provided with extrusion holes for the extrusion therethrough of melted thermoplastic material, and a means for cutting the extruded material into granules (column 1, lines 59-68). Loo et al. further teach that when the apparatus is in operation, the temperature of the die plate is above the boiling point of the cooling water (above 100°C) (column 3, lines 4-6). This temperature overlaps 20 to 100°C above of the temperature of the molten polymer. It is well settled that where the prior art describes the components of a claimed compound or compositions in concentrations within or overlapping the claimed concentrations a prima facie case of obviousness is established. See *In re Harris*, 409 F.3d 1339, 1343, 74 USPQ2d 1951, 1953 (Fed. Cir 2005); *In re Peterson*, 315 F.3d 1325, 1329, 65 USPQ 2d 1379, 1382 (Fed. Cir. 1997); *In re Woodruff*, 919 F.2d 1575, 1578 16 USPQ2d 1934, 1936-37 (CCPA 1990); *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974).

21. It would have been obvious at the time the invention was made to use a die plate with a temperature 20 to 100°C above the temperature of the polymer melt as taught in

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Loo in the process of Henn et al. in order to ensure that the polymer being extruded is kept uniformly heated and flowable (column 3, lines 10-13) and to further prevent chilling the thermoplastic below its solidification temperature (column 6, lines 24-25).

Response to Arguments

22. Applicant's arguments with respect to the rejection of claims 5, 7, 10-11, 13, and 15 under 25 U.S.C.102(b) as anticipated by Henn (5,525,637) have been considered but are moot in view of the new ground(s) of rejection. The rejection is now of claims 5, 13, 15 (and newly added claims 17-20 and 23-25) under 35 U.S.C. 103(a) as obvious over Henn.

23. However, the applicants' arguments are addressed below.

24. With regards to the arguments regarding the product-by-process, it is the "free radically polymerized" or "anionically polymerized" polystyrene contained within the process claim that is a product-by-process and thus, the product-by-process rejection is proper.

25. Applicant argues that the amendment claim language which changed added the transitional phrase "consisting essentially of" excludes component (b) disclosed in Henn, which is a styrene soluble elastomer.

26. Applicants' argument is not persuasive. As discussed in the rejection above, component (b), which makes up 5 to 30% by weight of the mixture of Henn, is at least one styrene-soluble elastomer. According to Henn, styrene soluble elastomers include styrene-acrylonitrile copolymers (column 3, lines 48-51). Component (a), which makes

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up 50 to 90% of the mixture, may be polystyrene (corresponding to polystyrene B of instant claim 1) (column 2, lines 24-26). Component (c) is a conventional block copolymer comprising at least 20% by weight styrene and a comonomer such as butadiene (thus, component (c) may be styrene-butadiene block copolymer and this corresponds to polystyrene A of instant claim 5 (column 4, lines 8-15). The addition of component (b), a styrene soluble elastomer, which may be styrene-acrylonitrile (see column 3, lines 48-51), which may be included in the polymer mixture of instant claim 5, does not materially affect the basic and novel characteristics described by the instant application and thus, "consisting essentially of" does not exclude the styrene soluble elastomer of Henn. Applicant has not provided evidence that the styrene soluble elastomer (styrene-acrylonitrile is described by Henn as a styrene soluble material and styrene-acrylonitrile may also be styrene copolymer A instant claim 5) affects the basic and novel characteristics of the instantly claimed invention and should therefore be excluded from the polymer mixture.

27. The elastomer included in the composition of Henn does not affect the basic and novel characteristics of the instant invention because the instant specification teaches that styrene-acrylonitrile reads on one of the claimed species of copolymer A of instant claim 5. Styrene copolymer A) of instant claim 5 may be styrene-acrylonitrile and therefore, styrene acrylonitrile (which is a styrene soluble elastomer as taught in Henn) will not affect the basic and novel characteristics of the instant invention. Additionally, the components of the instant claim and the elastomer of Henn are so related that one

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of ordinary skill in the art would not expect the basic and novel characteristics of the instantly claimed composition.

28. Applicant argues that steps b) through e) of the instant claims are not disclosed in Henn. This statement is not accurate. While applicant is corrected in stating that Henn teaches an embodiment in which polymer particles are first produced and then subsequently impregnated with blowing agent, Henn explicitly teaches that "impregnation" with a blowing agent may be "achieved by adding the blowing agent to the molten polymer, for example during extrusion..." at column 5, lines 25-31. Henn also teaches at column 5, lines 1-5 that the polymers of the invention are prepared by mixing components (a), (b), (c) and (d) (described in the rejection above) in a melt in an extruder and subsequent granulation of this blowing-agent containing polymer. Henn teaches but two methods in which the blowing agent is incorporated into the polymer mixture of the invention. The polymer mixtures of Henn may include the same amounts of the same materials as taught in instant claim 5.

29. In Example 1, the polymer melt is heated in an extruder to a temperature of 180°C. Given the teachings in Henn that this polymer melt may comprise blowing agent mixed therein (as described in column 5 at lines 1-5 and lines 25-31), steps (b) through (e) of instant claim 5 are disclosed in the invention of Henn. With regards to the pressure at which the blowing agent is melt-mixed with the polymer mixture of Henn, absent a teaching that this occurs under pressure, one of ordinary skill in the art would know that melt-mixing of the blowing agent takes place at ambient pressure or approximately 1 bar.

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30. As to the applicants' arguments regarding the rejection of claims 14-15 as obvious over Henn in view of Glück and the rejection of claim 16 as obvious over Henn in view of Loo, the arguments above with regards to Henn are incorporated herein.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARA NEGRELLI whose telephone number is (571)270-7338. The examiner can normally be reached on Monday through Friday 9:30 am EST to 6:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571)272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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